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ON SOME OF OUR COMMON INSECTS.

15.—THE COCCINELLIDÆ.

BY R. V. ROGERS, KINGSTON.

"Of all the painted populace that live in fields and live ambrosial lives," there is scarcely a family better known than those which compose the last of all the tribes of Hard-shells, the Coccinellidæ. To the young and to the old, to the illiterate and to the scientist, they are equally familiar and equally interesting. Popular sympathy is extended towards them by the elders because they do much good in preventing the excessive multiplication of Aphides; by the juveniles because they are very pretty little things and tamely pitter-patter to and fro, and their supposed misfortunes affect deeply sensitive little hearts, while infantile accents lisp "Lady-bird, lady-bird, fly away home; your house is on fire, your children are burned." They are distinguishable chiefly by the colors of and the spots upon their wing covers; the different species are sometimes difficult to discriminate; they number upwards of one thousand, and more than thirty species are known to inhabit Canada.

The general colors of the Coccinellidæ are yellow, red or orange, with black spots, and black with red, white or yellow spots, the spots being either lunate or round. Their shape is hemispherical, and although of variable size, an average specimen "bears a considerable resemblance in size and figure to an ordinary split pea; they have but very short legs and therefore creep but slowly; their powers of flight, however, are considerable." When alarmed or laid hold of, they fold up their tiny limbs and eject from the joints a yellow, mucilaginous fluid, which has a somewhat strong and disagreeable odor. This fluid entitles the pretty Lady-birds to be ranked among the *materia medica*, and to be assigned a place in the *Pharmacopœia*, for it is a superior, cheap and never-failing

remedy of that most harrowing of pains, the tooth-ache. The learned President of the Entomological Society of Ontario says that he has never possessed sufficient courage to test its qualities himself, but a well-known American brother of the net and bottle tells us that he tried this application in two instances, and the tooth-ache was immediately relieved ; but he confesses that he was uncertain whether the remedy or the faith of the patient acted therapeutically, or the tooth ceased troubling of itself. Let us be charitable and give the benefit of the doubt to the pretty little beetle.

The Germans call these insects *Marien-kaefer*, Lady beetles of the Virgin Mary ; while in France they have the equally fine names of *Vaches de Deice*, or *Betes de la Vierge*, Cows of the Lord or animals of the Virgin. And they have good claims to be held in such esteem, for they are most beneficial to man in destroying the plant-lice, which, if allowed to go on propagating and increasing unchecked, would soon reduce the most fertile country into a barren and a howling wilderness. Lady-birds both in their perfect and in their larval state, feed on these lice, and, providentially, few trees, plants or shrubs infested by these disgusting and destructive creatures are to be found whereon is not also this antidote for them. The grubs, which are of a flattened shape and darkish color, spotted usually with red or yellow, and furnished with six short legs near the fore part of the body, are far more voracious than the mature insect ; they creep along on the leaves of plants until they find the helpless Aphides, among which they ravage and riot like wolves in a sheep-cot, and then, doubtless, many a heart-broken Aphis parent, pointing to the aldermanic proportions of the lady, exclaim : "Foul murder hath been done ; lo ! here's the proof !"

Occasionally Lady-birds occur in immense swarms. Kirby and Spence relate that on one occasion the banks of the Humber were so thickly strewn with the common species, that it was difficult to walk without treading upon them ; at another time they covered in great numbers the sand-hills of Norfolk, and again, the cliffs of Kent and Sussex, "to the no small alarm of the superstitious, who thought them the forerunners of some direful evil."

The eggs of these little creatures are long and oval, of a yellowish color and deposited in patches, oftentimes among a colony of plant-lice, so that, thanks to the wondrous instinct of the mother, the larvae have not far to crawl to get their first hearty meal.

The larvae consume immense quantities of Aphides, and may be seen chasing, or rather, stalking the plant-lice, and eating them one after the other, taking the whole set on a leaf or stem in regular order. "The larvæ (see fig. 9) are rather long, oval, soft-bodied and pointed behind, with the

Fig. 9.



prothorax larger than the other rings, often gaily colored and beset with tubercles or spines." After having eaten voraciously for the appointed time, the larva attaches itself by its tail to a leaf or a twig—after the fashion of a caterpillar—and either throws back its skin or else keeps it loosely folded about it as a protection; in this position it remains quiescent for some ten or fifteen days, and then emerges a perfect insect.

We will now briefly refer to some of the well known Coccinellidae which make the Dominion of Canada their home.

The Two-spotted Coccinella, *C. bipunctata*, Linn., is our most common species. They appear to have two broods each season; the eggs are of an orange yellow, and attached in bunches of about twenty-five to the bark of trees. They hatch out when the leaves and their natural article of diet, the Aphis, appear. The body of the larva is black, with flattened tubercles, adorned on top with spines; on each side of the first abdominal segment is a yellowish spot, and there is another broad one in the middle of the fourth segment, and one on each side. Packard thus describes the *modus operandi* of the larva becoming a pupa, and the appearance of the pupa itself: "The larva begins the operation by attaching very firmly, with a sort of silky gum, its tail to the leaf, the point of attachment not being the extreme tip, but just before it, where the tip of the abdomen of the pupa is situated. Meanwhile the body contracts in length and widens, the head is bent upon the breast, and in about 24 hours the skin splits open and discloses the pupa. The body of the pupa is black; the head is also black, and the prothorax is black and yellowish pink, with a black dot on each side, and a smaller black dot on each edge. The meso-thorax, wing-covers, scutellum and legs are shining black. The abdominal rings are pale flesh-colored, with two rows of large black spots on each side, the spots being transverse; the terga of the fourth to the seventh segments are separated, the body being arched and leaving a deep furrow between."

Fig. 10.



The Nine-spotted Coccinella, *C. novem-notata*, Herbst. (see fig. 10), is one of our most common beetles, and may be found in all parts of our Dominion; it is of a red brick color, somewhat

larger than the Two-spotted, and ornamented with nine black spots.

The Plain Lady-bird, *C. munda*, Say. (see fig. 11), is rather smaller than the others of its kind, of a light brick red, but with its elytra

Fig. 11. unadorned with any spots.



The Three-banded Coccinella, *C. trifasciata*, Linn, is of a red brick color, marked with two irregular black bands across the elytra, and a black spot near the posterior angle. It is of an intermediate size between its cousins, the Two-spotted Lady-bird and the Fifteen-spotted Mysia.

The Spotted Lady-bird, *Hippodamia maculata*, De Geer (see fig. 12) is a small pinkish beetle, but occasionally of a pale red, with large black blotches twelve in number; two of them on one elytron are opposite to and touch two on the other. Mr. Riley says that this insect commits great havoc upon the Chinch Bug, and upon the eggs of the Colorado Potato Beetle.



The Thirteen-dotted Lady-bird, *H. 13-punctata*, Linn. (see fig. 13) is rather larger than the preceding: it has thirteen black spots on a brick red ground.



The Convergent Lady-bird, *H. convergens*, Guer. (see fig. 14) is of a deep orange red color, marked with black and white. It has been of great use in checking the ravages of that destructive pest, the Colorado Bug; its larva is blue, orange and black, and in its pupa state it is of the exact color of the larvae of the Colorado Beetle, for which it is often, doubtless, mistaken and ruthlessly destroyed.



The Parenthetical Lady-bird, *H. parenthesis*, Say, is a small beetle of a dull red color, and can be easily distinguished at a glance by the dark marks, curved like the bands of a parenthesis (), one on the hinder part of either wing cover; there are two black spots on each elytra, besides the parenthesis, one on the anterior part and the other on the inner margin, touching the one on the other cover.

The Fifteen-spotted Mysia, *Mysia 15-punctata*, Oliv., is black on the head and prothorax, with seven black spots on each of the brownish red elytra, and another on the scutellum, according to Packard. But it appears to vary much in its perfect form and in color from a very light

grey to a deep chestnut brown. The larva, which is about half an inch in length, black on the upper surface, with a pale spot on the under edge of the prothoracic ring, and furnished with six rows of stout spinulated spines, is an inveterate foe to the larvae of the Colorado Beetle, and on page 169 of the third volume of the ENTOMOLOGIST we have a most graphic account of the summary way in which the young lady despatches the grub.

The *Chilocorus bivulnerus*, Mulsant (see fig. 15) is an obese little thing, with minute legs, of a black color, and beautified with two yellow spots.



Such are a few of the very many Lady-birds that creep among our trees and adorn our Entomological cabinets.

REMARKABLE VARIATIONS IN COLORATION, ORNAMENTATION, &c., OF CERTAIN CREPUSCULAR AND NOCTURNAL LEPIDOPTEROUS LARVÆ.

BY THOMAS G. GENTRY, GERMANTOWN, PA.

Having spent considerable time during the past season in the collection and study of various larval forms of our twilight and night-fliers, I was peculiarly impressed with the novel colors, markings, and external structural characters presented by those that were taken late in the autumn, at the period when the leaves were donning their autumnal hues. To one who has rendered himself familiar with their usual outward characters, a moment's inspection was sufficient to show a marked contrast between those taken early in the season, when the leaves were fresh and green, and those captured later, when the foliage of the trees had sustained a check to their vitality. That these larval changes have a producing cause it shall be my aim to show in the conclusion of the present article.

Of the many specimens taken by the writer during the past season, and they were confined to but a few species of as many genera, none exhibited these variations more clearly and prominently than *Telescopus poly-*

phemus (*Attacus polyphemus* of Fabricius), *Actias luna*, Linn. (*Attacus luna* of Fabricius), *Eacles imperialis* of Hubner, and the *Sphinx quinque-maculata* of authors. Before entering into a description of the anomalous forms, the writer deems it not amiss to detail the leading characters of the normal ones after their last skin moulting, and just prior to their assumption of the chrysalis condition.

Actias luna, Linn.

Attacus luna, Fabr. (normal.)

Des.—Length of caterpillar, three inches. General color, pale bluish green. Head nearly elliptical, somewhat pearl colored. Oral appendages similarly colored. A pale yellow stripe extending along each side, just below the line of spiracles, from the first to the tenth segment; narrow transverse bands of a similar color between the rings, continued from side to side, crossing the dorsum. On each ring there are six pearl-colored warts, tinged with purple, and at the posterior part of the abdomen three brown spots, edged above with yellow. Specimens captured in August whilst feeding upon the Black Walnut (*Juglans nigra*.)

Variety of same.

Des.—Length, two and three-eighth inches. General color, reddish brown inclining to dullness. Head and oral appendages similar. The lateral and transverse stripes wanting, passing, no doubt, through the various shades of yellow, orange, red, into the general color of the body. Posterior brown abdominal spots present, but lacking the yellow edging and shining very conspicuously from the depth of their color. The six pearl-colored warts, with their purple tinge, have assumed a richer hue, blazing like a coronet of rubies. Taken in October, early part, while feeding upon *Juglans nigra*. Cocoons, of a beautiful reddish brown. Number of specimens taken, six.

Telea polyphemus (normal).

Des.—Length, three inches. General color, golden green. Head light brown, nearly elliptical; mouth pieces similarly colored. A transverse, conspicuously-colored yellow band on the posterior margin of the pro-thoracic segment. Six rows of gold-colored warts, two dorsal, two lateral, and two sub-lateral, reaching from the meso-thoracic to the eighth abdominal ring; each wart tipped with two moderately long blackish hairs. Between the rings, from the fourth to the tenth segment, a trans-

verse yellow band. Spiracles transversely oval, with brown centres, encircled with yellow. Taken during the latter part of August, while feeding upon *Acer rubrum*.

Variety of same.

Des.—Length $2\frac{3}{4}$ inches. General color green, with a stronger and richer tinge of yellow. Head and oral appendages a deeper shade of brown than the preceding. The warts of the color of red sealing wax along the back, but upon the lateral walls somewhat elongate oval in shape, of an orange color in the middle, deep red above and below, and with a narrow vein of the latter color encircling the whole. Spiracles transversely oval, red in the centre, and surrounded by an orange-colored border. Taken during the second week of October while feeding upon the leaves of *Acer rubrum*. Number of specimens captured, twelve. These caterpillars have a very close resemblance in markings to the normal form of the larva of *A. luna*.

Eacles imperialis, Hubner (normal).

Des.—Length, four inches. General color, varying from a dark to a light green. Head nearly elliptical, dark brown. Oral appendages similar in color. Six rows of spiniferous tubercles, two dorsal, two lateral, and two sub-lateral, extending from the first to the last segment. The meso and meta-thoracic spines moderately long and slightly curved; spiracles oval, with dark centres and yellowish margins. The entire larva invested with a dense growth of long gray hairs. Taken during the last week of August, and the early part of September. This species has been observed to feed upon *Juniperus Virginianus*, *J. communis*, *Acer rubrum* and the various species of *Pinus*. I might add here that for the past four years, in the neighborhood of Germantown, it seems to have deserted in a great measure Coniferous plants, and to have taken to *Acer rubrum*. Where I find one upon cone-bearing plants, I discover twenty upon the Red Maple.

Several varieties of the *imperialis* of Drury have been observed as late as the 12th of October, exhibiting marked contrasts from the normal form, and varying slightly from each other in the details of color and marking.

Variety A.

Des.—Length, two and three-fourth inches. General color, reddish brown. Head and oral appendages similarly colored. Spines small in

proportion to size. Entire body slightly invested with short scattered hairs. Two specimens only taken, while feeding upon *Acer rubrum*.

Variety B.

Des.—Length, two and a half inches. General color dark brown, exhibiting in certain parts a decided shade of black. In other particulars identical with Variety A. Found at the base of a pine tree. Most likely had been dislodged therefrom. It had evidently not attained its full size, since it continued to feed for nearly a week afterwards. No apparent change was observed in its color from the above, at the time of entering the ground.

Variety C.

Des.—Length, nearly three inches. General color light yellowish brown, with a dark median dorsal band an eighth of an inch long, extending from the posterior margin of the pro-thoracic to the beginning of the anal segments; a much wider one above the line of spiracles, and a similar one above that of the pro-legs. These longitudinal bands were crossed between the rings by transverse ones, similar in color. Spiracles with dark centres and yellowish rims. Entire larva presented a perfectly smooth surface, affording a striking contrast to that of the normal type. Taken upon *Acer rubrum*. Six specimens captured.

Sphinx 5-maculata (normal).

Des.—Length, three inches. General color, green. Head and oral appendages dark, inclining to black. Lateral, oblique, beaded bands of a light color, seven in number, each band passing obliquely through two segments, from the first abdominal to the anal inclusive. Spiracles nearly circular, with dark centres, surrounded by light annuli. Caudal appendage nearly black, somewhat armed with rudimentary spines. Taken in the early part of September, while feeding upon the different varieties of our ordinary white potato, *Solanum tuberosum*, L., the common Jamestown Weed, *Datura stramonium*, L., and the cultivated tobacco, *Nicotiana tabacum*, L.

Variety of same.

Des.—Length, varying from two and a half to two and three-fourth inches. General color dark, bordering on black, rivalling that of the head of the normal form. Lateral oblique bands similarly colored with

the body, their outline being indicated by the prominence due to their beaded structure. Spiracles dark, with no trace of light annuli. Observed during the middle of October, in the vicinity of Bristol, Penn., feeding upon the frost-bitten leaves of *Nicotiana tabacum*.

CONCLUSIONS.

That the abnormal forms described above should present such curious deviations from the ordinary normal type, is to me a rather interesting occurrence. That they are to be considered as the effects of a legitimate cause is a settled conviction in my mind. What the cause is it will be my aim to show. Happening at a period when the leaves of plants show a diminished state of vitality, and are assuming the characteristic hues of the season in consequence of the introduction of chemical changes into their parenchymatous material, it seems that the variations are in some way connected with *defective nutrition*. The unusually small sizes of the larvae, when compared with the normal forms, add great weight to such an opinion.

It will be seen that the colors of the caterpillars rival those of the changing leaves. In few cases all the transitional color stages from the natural one of the larva to that which is last assumed, were distinctly observed by the writer, thus clearly proving the two facts to be connected with each other in the relation of effect and cause.

If the beautiful and varied shades of green which many caterpillars present can be attributed to the green and granular chlorophyl of the leaves upon which they subsist, the conclusion must be irresistible that when chemical or other changes are inaugurated in the parenchyma of the leaf, thereby inducing color changes, the introduction of such food into the insect's economy must give rise to changes therein which will have a tendency to vary its external coloration and markings.

'Tis true that the variable colors of animals in many cases are brought about through the influence of the *will*. The changeableness of our ordinary *Hyla versicolor*, Lec., might be cited as an example, and the number of such might be prolonged to considerable length, but the cases are so numerous and so well known that it would not be advisable to give them notice in a paper like the present. In the above example the color variableness serves to conceal the animal from its enemies by adapting it to the colors of objects upon which it chances to place itself.

I do not know of any recorded instance where the larvae of the countless numbers of our Lepidoptera possess a similar faculty. Indeed, had such a case been observed, especially in a single individual of any of the above genera, I should assuredly have characterized it as one where the animal possessed the power of altering its color, in accordance with the dictates of a "will principle," whereby its protection was secured. This power of adaptation to the colors of the insects' natural food, being protective in its character, would be preserved, and thus, in the course of time, all the individuals of the species would adopt it.

But I am satisfied that the will (for assuredly these humble forms of animal life are endowed with a small degree of it) has nothing to do with these color transformations, but aver that they are due to the effects of a changed nutrition, as specimens, as above asserted, were observed exhibiting the transitional stages.

It has been shown by a French experimenter, according to the *Chronique de la Society d'Acclimatation*, that by feeding silk-worms on the leaves of the vine, cocoons of a beautiful red have been obtained, and by the employment of lettuce, others of a rich emerald green. By another Frenchman, silk of a beautiful yellow, of a fine green, and of a violet have been obtained by feeding the silk-worms on lettuce or on white nettle. An essential condition to the success of the experiment is to feed the worms on the mulberry leaves during their early ages, and to change the food twenty days prior to the introduction of the chrysalis state.

There can be no doubt that the silk-bearing glands of the caterpillars undergo a certain degree of modification, consequent upon the introduction of foreign material into the insect's economy, whereby they adapt themselves to the absorption of the proper elements from the general circulation, necessary to give to the silk its characteristic colors. It is clear that the color of the silk depends upon the food of the larva. Such being a true statement of the facts of the case, why will not a changed condition of the same food, evolved in obedience to the action of chemical or physical forces in the parenchymatous matter of the leaves, have a similar tendency? If the different capacities of different leaves to produce diverse effects are due to the chemical activities at work therein, bearing in mind that the same simple elements enter into the composition of all leaves, why will not leaves undergoing chemical and physical changes have different effects upon the tender beings that appropriate them as food, as well as the same food in a stable condition?

In caterpillars that exhibit different shades of green, their external appearances are due to the characteristic colors of their blood. If this blood undergoes changes, the muscles, tissues and other parts, which are the out-growths thereof, must evidently adapt their constitution and color thereto.

To my mind this theory seems perfectly plausible. Whatever cause may be assigned to account for the phenomena, there is no getting over the fact that the two are synchronous events.

A DISSERTATION ON NORTHERN BUTTERFLIES.

(Continued from Page 69).

BY WILLIAM COUPER, MONTREAL.

The meeting with *Papilio turnus* on the Island of Anticosti, astonished me, as I did not expect to find this butterfly so far north in the Gulf of St. Lawrence. Only two specimens were taken during the season, and old settlers say that it is always rare. Anticosti is evidently its most northerly limit, as it does not occur on the opposite shore of Labrador. It is common at Halifax, N. S., and in many localities along the south side of the St. Lawrence, until we reach the lake and rocky regions on the height of land from which the Assomption river flows north of Montreal. Plants of the family *Oleaceæ* are generally selected by *turnus* as food of the larvae. They feed on *Fraxinus trifoliata* and probably the Swamp Ash of the south. The Anticosti food plant of *turnus* is not known to me; it may be a species of *Fraxinus*; whichever it is, the Island of Anticosti, which stands between latitudes 49° and 50°, is evidently the most northern range of that class of plants tending to the existence of this butterfly.*

* NOTE.—Mr. Scudder gives the following food plants of *P. turnus*: Apule, wild-thorn, choke cherry, cultivated cherry, alder, tulip, bass-wood, oak, black ash and birch. The former eight do not grow on Anticosti, but the latter two may Mr. Saunders found them feeding on cherry—"CAN. ENT., vol. i, p. 74."

The Island specimens are smaller, and the dark portions of their bodies blacker than those of the west and south. Although undoubtedly *turnus*, they exhibit sufficient change of color to claim attention. Possibly the larval food is the power whereby this variety is produced. I have not had an opportunity of comparing specimens of *turnus* from widely separated localities, but it is a fact that those occurring in the latitude of Anticosti are different from the *turnus* of the south and more temperate latitudes of America.

The dark color observable in the Anticosti *turnus* supports my view that boreal insects, especially the Diurnals of high latitudes, are blacker where the dark scales occur than their congeners of the south. The fact that *Papilio glaucus* var. *turnus* * feeds on the Hickory, while *turnus* has not been found feeding on the leaves of this tree, is, in part, evidence that although the variety is thus attracted by change of appetite to an unusual plant, the true form (*turnus*) holds to those food plants which have been recorded by the early writers on Entomology.

I took a few specimens of *Colias* on Anticosti last July, which Mr. Strecker informs me are *philodice*. † This is another rare butterfly on the Island, where its habits differ from those found at Quebec. The Anticosti *philodice* is a difficult insect to capture; its flight is rapid and continuous during the occasional hours of its appearance, and it is only towards the end of July, when the weather becomes cold, that it can be easily approached. ‡ When it alights on a flower, instead of being erect on its feet, it lies sideways, as if to receive the warmth of the sun. Here, then, we have the most northern *habitat* of *Colias philodice* almost on the dividing line between the Canadian and Arctic Insect Fauna.

* NOTE.—See CAN. ENT., vol, v, p. 9.

† NOTE.—To my subscribers I distributed an equal share of what I supposed were two species of *Colias*, taken last year on Anticosti, and one of each was sent to Mr. Grote, who did not include them in his article on the butterflies of that island.

‡ NOTE.—Its habits are similar to *Colias edusa* of Europe, which has a lively flight. Mr. Coleman says that "his pursuer has need of the seven league boots, "with the hand of Mercury, to insure success in the fair open race, if that can be called a race at all, between a heavy biped struggling and perspiring about a "slippery hill-side, such as *edusa* loves, and a winged spirit of air, to whom up-hill "and down-hill seems all one."

I believe that the most expert Entomologist would pronounce the *Anticosti philodice* different in habit from those found in the vicinity of Canadian cities. There appears to be a difference of opinion among Entomologists in reference to the variations in this insect. Mr. Edwards, of West Virginia, says: "I suspect that at least two species are passing under the name of *Colias philodice*. The species is known to vary widely, but some of the supposed varieties are extreme—almost too much to be considered varieties, unless proved to be so by actual breeding from the egg."

The only correct method by which to arrive at a conclusion as to the species constituting the genus *Colias*, would be the tracing of the imago (true form or variety) to the plants on which it deposits its eggs. It is possible that eggs deposited by a single female on two distinct American plants may produce larvæ showing variation from each other and from the ordinary coloration of larvæ of the original type, which may have been described in another latitude, and taken on a third food plant. These variations are known to occur, and a wide difference is seen between many species which systematists term representative American forms of European types. There is no question that great deviation exists between the species which are found on the two Continents, and the cause of such variation is what is now wished to be arrived at. We find certain butterflies localized or kept within a certain range, because climate restricts the growth of the bulk of that class of plants on which they feed. In such a case, one hundred examples of the butterfly will probably show no more variation than is general between the sexes, and I give *Pieris (Ganoris) borealis* as an illustration of this fact. Larvæ of the greater portion of North American Diurnals are said to feed on from two to ten distinct plants, and I am of opinion that it will yet be proved, when proper attention is given to Entomology in connection with Chemical Botany, that many of the perplexing varieties occurring among the true forms are produced by the food * which sustain the larvae.

* NOTE.—W. S. Coleman, in his remarks on the brilliant metallic spots which adorn the chrysalides of butterflies, says: "This golden effect is produced by a brilliant white membrane underlying the transparent yellow outer skin of the chrysalis (*Cynthia cardui*), and it may be imitated, as discovered by Lister many years ago, by putting a small piece of black gall in a strong decoction of nettles; this produces a scum which, when left on cap-paper, will exquisitely gild it, without the application of the real metal."

Late experiments made by a French Entomologist on caterpillars of a *Bombyx*,

The species comprising the genus *Grapta* of this country, are subject to very perplexing variations. Mr. Edwards, in vol. v, p. 148, CAN. ENT., writes that Mr. Mead of New York, by experiment, identified *Grapta dryas* with *comma*. Two females of *Grapta dryas* were tied in a muslin bag, which was attached to a branch of Hop-vine, on the 3rd of July. "The result was a large number of eggs laid on the leaves and in the "bag." The eggs were all hatched on the 5th, and the first ones began to change on the 21st (he does not state the month, but as the imagines appeared on the 30th, I suppose the time to be August). "Towards "maturity some of the larvæ were white; the others were black, like the "larvae represented in Mr. Edward's plate of *comma*."

Here, then, is one experiment with "upwards of sixty" larvae, of what is said to be the product of *dryas*, resulting in giving imagines of true *comma*. As Mr. E. does not state how many white adult larvae were seen, it appears to me that this experiment, although a good one, does not prove the leaves of the hop to be free from eggs of another variety, and it may be possible that a female of *comma* visited that vine prior to the bag being placed over the branch. We have no direct evidence that all were the product of *dryas*.

Messrs. Edwards, Saunders, Scudder and Mead deserve great credit for their labors in metamorphic Entomology, but it appears to me that a link is missing—the *admixture* of the sexes prior to the deposition of the eggs. Were the *dryas* females the selection of *comma* males?

As illustrating the confusion in which the species of *Grapta* stand at present, two specimens sent to Mr. Edwards were stated by him to be *progne* and *gracilis*, and two similar ones sent to Mr. Strecker were reported as *faunus* and *comma*. *Faupus* is taken on Anticosti, and I am therefore inclined to think that the latter is dimorphic with *gracilis*. I found a larva of a *Grapta* feeding on wild currant, on Anticosti, a description of which was sent to Mr. Edwards, of West Virginia, who says: "I don't know what to make of the larva of *Grapta* you describe.

were as follows: "It was ascertained that silk worms fed on vine leaves yielded silk "of a red color; when they had lettuce alone they gave cocoons of an emerald green; "nettle leaves produced violet silk, and it was also found that numerous combinations "of colors were the result of a varied diet of mixed leaves, fed during the last 20 "days of the larva period. Yellow, red, green and violet seem to be the colors most "successfully produced."

"It would not appear to be that of *progne*, which feeds on currant, as that is olive brown in color, and this color covers nearly all the surface. "*Comma* has a yellow skin in some of its phases, with black marks. At other times it is black, with yellow marks. It varies greatly. I do not know that it feeds on currant. *Faunus*, Scudder thinks, is dimorphic "with *gracilis*. I don't. The larva of *faunus* feeds on willow. It may have other food plants, but so far we only know of willow; and it "looks like the larva of *C. album*, of Europe; that is fore-half rusty "red, hind-half white, so that your description does not fit that."

Mr. Edwards, in his remarks on larvae raised from the females of *interrogationis*, describes them as exhibiting "every distinct type of "coloration, and that either type of larvae produced either sex or form "of butterfly indifferently." *G. interrogationis* has been found feeding on several plants, one of which is *Tilia pubescens*, and it will surely be conceded that there is a marked difference between the taste of the leaves of the hop and linden. If the color of a larva is affected by food taken into its system, does it not appear reasonable that the imago issuing from it will be more or less marked? Say, for instance, that *Grapta comma* feeds on two distinct plants, and that a male whose larva fed on the hop, took for its mate a female which fed on elm. In all probability a versicolor butterfly would be the result, although the form would be that of *comma*. It is on the ground of finding northern species confined to a single plant, and which presents no varieties, that I conclude that such as are extremely phytophagic are those which produce the greatest number of varieties, while their forms are lessened or extended in accordance with geographical situation. *

There are a few other well marked species inhabiting the north belonging to *Lycaenidae* and *Hesperidae*, but as the previous remarks apply equally to them, I shall not extend the matter. My object is to ventilate

* NOTE.—Coleman, in his "British Butterflies," remarks on the variety *Gonopteryx cleopatra*, of Europe, that M. Boisduval has proved that *G. rhamni* and the former are identical, and in a foot note adds that "they are two varieties, but "why they fly together he cannot explain; but it is possible there may be a constitutional difference between individual insects, just as we see that of two Englishmen going to a hot climate—one will brown deeply, while the complexion of the "other will hardly alter, although exposed to the very same external influence." In another portion of Coleman's book he thinks it possible that *Colias edusa* var. *helice* may be a male between *C. edusa* and *C. hyale*.

the subject, in order that it may be more thoroughly investigated by those who have leisure. The theory advanced is, I think, a reasonable one, and is based upon what I have noticed in my rambles during a number of years in the woods and fields.

MICRO - LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 77.)

ERRATA.

Page 73, line 1, for "costa" read *costal vein*.

" " 3, for "costal" read *subcostal*.

" " 23, for "place" read *plead*.

Page 75, line 7 from the bottom, for "there" read *then*.

PHILONOME, *gen. nov.*

The little insect which I have made the type of this new genus, unites in itself the characters of several genera.

Tongue naked, about as long as the maxillary palpi, which nearly conceal it. The maxillary palpi are about as long as the labial palpi and in the dead insect are laid upon the coxae; they are rather densely scaled, the scales being somewhat roughened. The labial palpi ascend about half way to the vertex; the first and second joints are short; the second has a minute tuft at the end beneath, and the third is about as long as the first and second together, and somewhat roughened with scales. Face broad, smooth, with appressed scales and much retreating; vertex roughened, with a large tuft of erect scales which extends down between the base of the antennae; no ocelli; eyes moderate, visible from beneath, but concealed above by the large eye-cap which clothes the somewhat swollen basal joint of the antennae. Stalk of the antennae simple, about two-thirds as long as the primaries.

Primaries lanceolate, almost caudate; the costal vein runs near the margin, which it reaches at about its middle. The subcostal sends two branches to the costal margin from near the end of the discal cell, which is closed rather acutely by the union of the subcostal and median veins. The first of these branches is given off at the point where the subcostal bends towards the median, and the second is given off almost from the apex of the cell. The median vein is unusually large and distinct, and from just behind the middle it sends a branch to the dorsal margin, from the end of the cell it sends a furcate branch also to the dorsal margin; from the apex of the cell a discal branch, which is almost continuous with the median, passes to apex, becoming trifurcate near the apex, one of its branches going to the costal margin near the apex, one to the apex and one to the dorsal margin near the apex. One or more tufts of raised scales.

Hind wings linear lanceolate; costa somewhat naked from the base to the basal fourth, and from thence excavated to the apex; the costal vein is close to the costa and enters it about the basal fourth; the subcostal proceeds to the apex; behind the middle it sends two branches to the dorsal margin; the median is furcate behind the middle, close to the margin, both branches entering the dorsal margin. Cell unclosed.

P. Clemensella. N. sp.

Palpi, face and eye-caps white; tuft reddish orange; antennae pale reddish orange; thorax white, with a reddish orange narrow stripe just before the apex, and a spot of the same hue on each shoulder. Primaries reddish orange, with two white basal streaks, one median, the other dorsal, the latter continuous with the white of the thorax, and extending to a small raised tuft of brown scales just before the middle of the dorsal margin; from the tuft the dorsal white streak is deflexed obliquely to about the middle of the wing, where it intersects at an acute angle the median basal white streak; at the apical third of the costa is a rather long oblique costal white streak, which is produced along the extreme costa towards but not to the base; apical portion of the wing dusted with dark brown. Ciliae whitish, with an oblique, rather wide streak of reddish orange, dusted with brown, resembling the "hook" of many species of *Gracillaria*.

Al. ex. scarcely $\frac{1}{3}$ inch. Kentucky. Larva unknown.

I have named it in honor of Dr. Clemens, who may be called the father of this branch of Entomology in this country.

ARCTIA ARGE, DRURY.

BY PROF. S. H. PEABODY, AMHERST, MASS.

A moth taken by an evening lamp, May 25, 1873, on that night and the next day laid eggs which hatched June 14. The larvæ fed freely on the leaves of the common narrow-leaved plantain, *Plantago lanceolata*. The earlier moults were not observed with care; the last two occurred June 23 and July 1.

July 6, the larvæ ceased feeding and next day began to spin their cocoons in the breeding cage. July 26, imagos appeared, copulated and laid eggs for a second brood. Other imagos appeared at about the same time from without, showing the species to be double brooded. The cycle of transformations occupied 42 days from the hatching, 62 from the laying of the egg.

When the larvæ ceased feeding they were $1\frac{3}{4}$ inches long, $\frac{1}{4}$ inch in diameter, tapering slightly to each end.

Head small, black, marked in front with an impressed inverted Λ . Fore legs black; pro-legs yellow with black fringe.

Body dark brown; a white dorsal stripe, and midway to spiracles a white lateral stripe, shaded to orange on each segment; spiracles black; an orange spot above each, and a wavy white line beneath. Underneath dirty gray; on each segment twelve black tubercles, two on each dark stripe, clothed with long white hairs.

The moth is quite abundant in this locality.

EDITORIAL SUMMARY.

THE BUTTERFLIES OF NORTH AMERICA, by W. H. Edwards—*Second Series*.—We are much pleased to be able to announce that the first part of the second volume of this admirable work will be issued during the present month, by Messrs. H. O. Houghton & Co., Riverside Press, Cambridge, Mass., the succeeding parts to appear quarterly, with five plates in each part. The illustrations which adorn the pages of Vol. 1 are admirably truthful and life-like, and we have no doubt but that the forthcoming volume will in this respect quite equal its predecessor. The talented artists who were engaged upon the plates of the previous volume,

Miss Mary Peart and Mrs. Bowen, will execute the plates of this also. Illustrations of the eggs and larvæ, as well as the butterfly, in many cases will be given, which will add greatly to the interest of the work. Price \$2.50 per part. We bespeak for this volume an enlarged circulation.

FRANCIS WALKER, of the British Museum, has lately published a supplement to his Catalogue of Hemiptera; also the first part of a general list of Diptera. Copies of these pamphlets may be had from E. W. Janson, 28 Museum Street, London, W. C., England.

WE HAVE received a copy of a Memorial to the Legislature of Massachusetts from the American Academy of Arts and Sciences, setting forth the desirability of a new and thorough survey of the state in which besides the usual geological matter, there should be "full descriptions and truthful illustrations of the animals and plants, including their natural history, transformations, and relations to man and his requirements, said reports to be prepared with special reference to an intelligent use by the people." The State could not make a wiser use of its funds. We heartily wish the memorialists success, feeling sure that in such a publication Entomology will receive its due share of attention.

A NEW ENTOMOLOGICAL MONTHLY.—We are pleased to learn that the Cambridge Entomological Club, organized last autumn, have determined to issue an organ to be called "Psyche," a 4-paged monthly, to begin with. The first number will be issued in a few weeks. We commend the Cambridge Club for their enterprise, and shall gladly welcome their little sheet, and sincerely hope it may live and grow.

BULLETIN OF THE BUFFALO SOCIETY OF NATURAL SCIENCES.—We have received No. 4, which completes the first volume of this valuable publication. The present part contains eight plates, making eleven in all which have appeared in the volume of 289 pages. No. 4 contains the following Entomological papers: "On the Butterflies of Anticosti," "On Eight Species of Noctuidæ," and "Determination of Brazilian Sphingidae Collected by Mr. Chas. Linden," by Aug. R. Grote; "Notes on the Species of *Pasimachus*," by John L. Le Conte, M. D.; "The Two Principal Groups of *Urbicolæ*," "Note on the Species of *Glaucopsyche* from Eastern North America," by Samuel H. Scudder; "Notes on North American Lepidoptera," "Description of Two New Noctuidæ from the Atlantic District," by H. K. Morrison; "New Phalaenoid Moths,"

"Rectification of Treitschke's Use of Hubner's Generic Term 'Cymatophora,'" by Leon F. Harvey, M. D. Price of this volume complete, Three Dollars. Part 1 of vol. 2 is now in hand, and will shortly appear; it will contain, among other articles, a catalogue of the Noctuidae of North America, embracing nearly 800 names, by Aug. R. Grote, with one colored plate. The subscription for the new volume will be Four Dollars. Remittances should be sent to Leon F. Harvey, M. D., Buffalo, N. Y.

CATOCALA RELICTA.—Mr. Robert Bunker, of Rochester, N. Y., has sent us a very nice photograph of an unusually dark female specimen of *relicta*. He says: "It is well known that this species alights usually on white surfaces; the specimen from which this photograph was taken was captured on a surface as dark as itself."

BOOKS RECEIVED.

Proceedings of the Boston Society of Natural History, vol. xvi, part 2, June, 1873—Jan., 1874, with two plates and several wood-cuts.

On the Oviposition of the Yucca Moth, from the American Naturalist, pp. 4, by Prof. C. V. Riley.

Controlling Sex in Butterflies, from the American Naturalist, pp. 9, by Prof. C. V. Riley.

The Grape Phylloxera, from the Popular Science Monthly, pp. 16, with seven cuts, by Prof. C. V. Riley.

The Grape Phylloxera, False Theories. From the New York Weekly Tribune, by Prof. C. V. Riley.

Lepidoptera, Rhopalocera and Heterocera Indigenous and Exotic Part 9, with one colored plate containing figures of eleven species of Catocala, by Herman Strecker, Reading, Pa.

Note on the Species of Glauropsyche from Eastern North America, 8vo., pp. 2, by Samuel H. Scudder, Cambridge, Mass.

The Two Principal Groups of Urbicolæ (Hesperiidæ, Auct.) 8vo., pp. 2, by Samuel H. Scudder, Cambridge, Mass.

The Pterostichi of the United States, from Proc. Acad. Nat. Sci., Philadelphia, July 27, 1873, pp. 19, by John L. Leconte, M. D.

Synonymical Remarks upon North American Coleoptera, from Proc. Acad. Nat. Sci., Phila., pp. 16, by John L. Leconte, M. D.

Notes on the Species of Pasimachus, from Bul. Buffalo Soc. Nat. Sci., pp. 8, by John L. Leconte, M. D.

On the Origin of Insects and Remarks on the Antennal Characters in the Butterflies and Moths, from Proc. Amer. Assoc., pp. 3, by Aug. R. Grote.

The Natural History of a Polymorphic Butterfly, from the American Naturalist, May, 1874, pp. 10, by Samuel H. Scudder.

Report Dept. Agriculture, Washington, April and May.

Science Gossip, March and April.

Nature to April 10th.

Le Naturaliste Canadien, Mars et Avril.

The Zoologist, March and April.

Newman's Entomologist, March and April.

Journal of Education, Feb'y.

Prairie Farmer to May 9.

Indiana Farmer to May 2.

Canada Farmer to May 1.

Western Rural to May 9.

Bruce Reporter to May.

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